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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,366	12/09/2003	Kenneth Boyd	81092490FGT1889	1365

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EXAMINER
THORNEWELL, KIMBERLY A

ART UNIT	PAPER NUMBER
2128	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

	Application No.	Applicant(s)
Office Action Summary	10/707,366	BOYD ET AL.
	Examiner	Art Unit	
	Kimberly Thornewell	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>*28 November 2006*</u>.
2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-20* is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) *1-20* is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a) ☐ All b) ☐ Some * c) ☐ None of:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____.
      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1.   Claims 1-20 are pending in the instant application.

Response to Arguments

Double Patenting:

2.   The terminal disclaimer filed on 11/28/2006 disclaiming the terminal portion of any

patent granted on this application which would extend beyond the expiration date of the full

statutory term of any patent granted on co-pending Application 10/707,368, filed on 12/9/2003

has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Objections:

3.   The Examiner thanks the Applicant for amending claims 1, 8, and 17 to overcome the

objections for informalities. Accordingly, the objection to these claims is withdrawn.

Claim Rejections, 35 USC 112

4.   The Examiner respectfully notes the amendment of claim 1 by the Applicant to give

antecedent basis to the terms "initial steering wheel input" and "first steering wheel input." The

Examiner further notes paragraphs [0029] and [0031], as cited by the Applicant in order to

provide support for the limitations. While the limitations do contain sufficient antecedent basis

in the claim language, a new rejection under 35 USC 112 is raised because it is unclear as to how

the "initial" steering wheel angle differs from the "first" steering wheel angle input. For

example, one of ordinary skill in the art would not be able to tell whether the "initial" steering

wheel angle input is determined before the claimed step of "[determining] a steering wheel angle

input to the computer model by comparing the look ahead point and the intended path;" and if a

"first" steering wheel angle input is performed during that claimed step. Clarification is

requested.

Claim Rejections, 35 USC 101

5.   The Applicant has amended claim 10 in order to recite a step of outputting results of the

operating step of the claimed method. In view of this amendment, and in view of the portion of

the specification relating to outputs for the computer models (paragraphs [0024]-[0026]), the

rejection of the claims under 35 USC 101 is withdrawn.

Claim Rejections, 35 USC 103

6.   Applicant's arguments, see page 6 last paragraph-page 7 last paragraph, filed 11/28/2006,

with respect to the rejection(s) of claim(s) 1-20 under 35 USC 103(a) under Sharpe in view of

Taylor have been fully considered and are persuasive. Therefore, the rejection has been

withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view

of newly discovered prior art references.

Specification

7.   The title of the invention is not descriptive. A new title is required that is clearly

indicative of the invention to which the claims are directed. The title of the invention is directed

to controlling a vehicle computer model with understeer. The claims appear to be embodied

primarily by Figure 5, and paragraph [0017] of the disclosure states that the same figure

illustrates a vehicle computer model in an oversteering condition.

Claim Rejections - 35 USC § 112

8.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9.   Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for

failing to particularly point out and distinctly claim the subject matter which applicant regards as

the invention. Claim 1 makes reference to "[generating] an output *in response to* the vehicle

model and *an initial steering wheel input or first steering wheel input*." Although an output is

generated in response to one of these inputs, the claim does not differentiate between an "initial"

steering wheel input and a "first" steering wheel input, nor does it specify when in the method

either of these inputs is determined.

Claim Rejections - 35 USC § 101

10.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

11.   Claims 19-20 are rejected under 35 U.S.C. 101 because the claimed invention is directed

to non-statutory subject matter. Applicant has not set forth a practical application of the method

of claim 19. Therefore, a real-world result has not been achieved, and the claims are deemed

non-statutory.

Claim Rejections - 35 USC § 102

12.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on
> sale in this country, more than one year prior to the date of application for patent in the United States.

13.   Claims 1, 3-4, 8-10, 12-13 and 17-18 are rejected under 35 U.S.C. 102(b) as being

anticipated by Rossetter et al., "A Study of Lateral Vehicle Control Under a 'Virtual' Force

Framework," Proceedings of the 2002 AVEC Conference.

As per claim 1,

Rossetter discloses a simulation system and method for simulating an operation of an

automotive vehicle comprising:

- An input providing vehicle information (**page 3 figure 1**, *vehicle model*) and path

  information (**page 6 figure 3**, *coordinates based on road centerline*);

- A controller having a vehicle computer model therein (**page 2 second full**

  paragraph), said controller programmed to determine a rear side slip angle of a

  vehicle computer model (**page 3 equation 9**);

- When the rear side slip angle is greater than a threshold (**page 13 last paragraph,**

  varying lookahead as vehicle is oversteering), determine a look ahead scale factor

  (**page 12 equation 33**);

- When the rear side slip angle is greater than the threshold, increase a look ahead point as a function of the look ahead scale factor (**page 12 equation 35 and definitions of d1-d4**);

- Determine a steering wheel angle input to the computer model by comparing the look ahead point and the intended path (**page 15 equation 38**);

- Operate the computer model with the steering wheel angle input (**page 13 first full paragraph**, *applying the neutral steer point*); and

- Generate an output in response to the vehicle model and an initial steering wheel input or first steering wheel input (**page 16 second paragraph**, *manipulating inputs to get a desired output*).

As per claim 3,

Rossetter discloses the controller being programmed to determine a longitudinal vehicle velocity and a lateral vehicle velocity (**page 4 section 3 first paragraph**) and determine the rear side slip angle as a function of the longitudinal vehicle velocity and the lateral vehicle velocity (**page 3 equations 10 and 11**).

As per claim 4,

Rossetter discloses the controller being programmed to determine a look ahead scale factor as a function of the rear side slip angle (**page 12 equation 33**).

As per claim 8,

Rossetter discloses when the rear side slip angle is not greater than the threshold, the

controller is programmed to determine an unscaled look ahead factor (**page 13 first full**

paragraph).

As per claim 9,

Rossetter discloses the controller being programmed to determine a steering wheel angle

input when the vehicle is not on target (**page 4 last paragraph**).

As per claim 10,

Rossetter discloses a method of operating a vehicle computer model having vehicle

information and path information therein, the method operating on a digital computer system and

comprising:

- Determining a rear side slip angle of a vehicle computer model (**page 3 equation**

  9);

- When the rear side slip angle is greater than a threshold (**page 13 last paragraph,**

  varying lookahead as vehicle is oversteering), determining a look ahead scale

  factor (**page 12 equation 33**);

- When the rear side slip angle is greater than the threshold, increasing a look ahead

  point as a function of the look ahead scale factor (**page 12 equation 35 and**

  definitions of d1-d4);

- Determining a steering wheel angle input to the computer model by comparing

  the look ahead point and the intended path (**page 15 equation 38**);

- Operating the computer model with the steering wheel angle input (**page 13 first full paragraph**, *applying the neutral steer point*); and

- Outputting results of the operating step (**page 16 second paragraph**, *manipulating inputs to get a desired output*).

As per claim 12,

Rossetter discloses the controller being programmed to determine a longitudinal vehicle velocity and a lateral vehicle velocity (**page 4 section 3 first paragraph**) and determine the rear side slip angle as a function of the longitudinal vehicle velocity and the lateral vehicle velocity (**page 3 equations 10 and 11**).

As per claim 13,

Rossetter discloses the controller being programmed to determine a look ahead scale factor as a function of the rear side slip angle (**page 12 equation 33**).

As per claim 17,

Rossetter discloses when the rear side slip angle is not greater than the threshold, the controller is programmed to determine an unscaled look ahead factor (**page 13 first full paragraph**).

As per claim 18,

Rossetter discloses the controller being programmed to determine a steering wheel angle

input when the vehicle is not on target (**page 4 last paragraph**).

Claim Rejections - 35 USC § 103

14.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

15.   Claims 2, 5-7, 11, and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Rossetter as applied to claims 1, 3-4, 8-10, 12-13 and 17-18 above, in view of O'Brien et

al., "Vehicle Lateral Control for Automated Highway Systems," IEEE Transactions on Control

Systems Technology, May 1996.

As per claims 2 and 11,

Rossetter does not disclose expressly the threshold for the rear side slip angle being about

15 degrees. O'Brien discloses a method and system for operation of an automotive vehicle

(**abstract**). O'Brien teaches calculating the slip of a vehicle (**page 268, equation 2**), and that the

ideal maximum slip for a vehicle is 15 percent (**page 268 second full paragraph**).

It would have been obvious to one of ordinary skill in the art of steering simulation, at the

time of the present invention, to modify Rossetter's steering simulation system and method with

O'Brien's maximum slip rate in order to achieve a design choice of a threshold of 15 degrees for

a side slip angle. The motivation for doing so would have been to determine a steering wheel

angle input based on the amount of circumferential force on the tire (O'Brien page 268 second

full paragraph).

As per claims 5 and 14,

Rossetter does not disclose expressly a look ahead factor being determined as a function

of an exponential of the rear side slip angle. O'Brien discloses a method and system for

operation of an automotive vehicle (**abstract**). O'Brien teaches a look ahead factor as a function

of an exponential of the rear side slip angle (**page 268 equation 4**, *side force*).

It would have been obvious to one of ordinary skill in the art of steering simulation, at the

time of the present invention, to modify Rossetter's steering simulation system and method with

O'Brien's formula for determining side force in able to determine a look ahead factor as a

function of an exponential of the rear side slip angle. The motivation for doing so would have

been to improve flexibility by being able to simulate the steering of a vehicle for a large range of

operating conditions (O'Brien page 273 column 1 third full paragraph).

As per claims 6 and 15,

Rossetter does not disclose expressly a look ahead factor being determined as a function

of an exponential of a product of the rear side slip angle and a constant. O'Brien discloses a

method and system for operation of an automotive vehicle (**abstract**). O'Brien teaches a look

ahead factor as a function of an exponential of a product of the rear side slip angle and a constant

(**page 268 equation 4**, *side force*).

It would have been obvious to one of ordinary skill in the art of steering simulation, at the time of the present invention, to modify Rossetter's steering simulation system and method with O'Brien's formula for determining side force in able to determine a look ahead factor as a function of an exponential of a product of the rear side slip angle and a constant. The motivation for doing so would have been to improve flexibility by being able to simulate the steering of a vehicle for a large range of operating conditions (O'Brien page 273 column 1 third full paragraph).

As per claims 7 and 16,

O'Brien discloses the constant being about .02 (**page 268 column 1 third full paragraph**).

16.   Claims 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rossetter as applied to claims 1, 3-4, 8-10, 12-13 and 17-18 above, in view of Chen et al., "Differential-Braking-Based Rollover Prevention for Sport Utility Vehicles with Human-in-the-loop Evaluations," Vehicle System Dynamics, November 2001.

As per claim 19,

Rossetter discloses a method of operating a vehicle computer model having vehicle information and path information therein comprising:

- Determining a rear side slip angle of a vehicle computer model (**page 3 equation 9**);

- Determining a look ahead point (**page 13 last paragraph,** *increasing look ahead*);

- When the rear side slip angle is greater than a threshold (**page 13 last paragraph,** *varying lookahead as vehicle is oversteering*), determining a look ahead scale factor (**page 12 equation 33**);

- When the rear side slip angle is greater than the threshold, increasing the look ahead point as a function of the look ahead scale factor (**page 12 equation 35 and definitions of d1-d4**);

- When the rear side slip angle is less than the threshold, maintaining the look ahead point (**page 13 first full paragraph**); and

- Operating the computer model with the steering wheel angle input (**page 13 first full paragraph,** *applying the neutral steer point*).

Rossetter does not disclose expressly determining a steering heel angle input to the computer model as a function of an error between the look ahead point and the intended path when the vehicle is off target. Chen discloses a method for simulating controlling of steering for a vehicle in order to calculate time-to-rollover (**abstract**). Chen further discloses determining a steering wheel angle input when the vehicle model is off target (**page 11 figure 18**) as a function of error between the look ahead point and the intended path (**figure 19, page 12 first paragraph**).

It would have been obvious to one of ordinary skill in the art of steering simulation, at the time of the present invention, to modify Rossetter's vehicle computer model operation method

with Chen's algorithm for determining a steering wheel angle input as a function of error

between the look ahead point and the intended path. The motivation would have been to

optimize cost by minimizing previewed path errors (**Chen page 12 second paragraph**).

17.   Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rossetter as

applied to claims 1, 3-4, 8-10, 12-13 and 17-18 above, in view of Chen as applied to claim 19

above, and further in view of O'Brien as applied to claims 2, 5-7, 11, and 14-16 above.

As per claim 20,

Neither Rossetter nor Chen disclose expressly a look ahead factor being determined as a

function of an exponential of the rear side slip angle.   O'Brien discloses a method and system

for operation of an automotive vehicle (**abstract**). O'Brien teaches a look ahead factor as a

function of an exponential of the rear side slip angle (**page 268 equation 4**, *side force*).

It would have been obvious to one of ordinary skill in the art of steering simulation, at the

time of the present invention, to modify Rossetter/Chen's steering simulation system and method

with O'Brien's formula for determining side force in able to determine a look ahead factor as a

function of an exponential of the rear side slip angle. The motivation for doing so would have

been to improve flexibility by being able to simulate the steering of a vehicle for a large range of

operating conditions (O'Brien page 273 column 1 third full paragraph).

Conclusion

18.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Kimberly Thornewell whose telephone number is (571)272-6543.
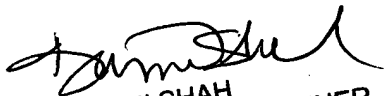
The examiner can normally be reached on 9am-5:30pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Kamini Shah can be reached on (571)272-2279. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

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Kimberly A. Thornewell
Patent Examiner
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KAT

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